SOLAR HEATING & COOLING PROGRAMME
INTERNATIONAL ENERGY AGENCY

SolarPACES
Solar Power & Chemical Energy Systems

New Joint Task 64/IV: Solar Energy for Process Heat Systems

Leaders: Andreas Häberle & Klaus Hennecke

Solar Process Heat Joint Task 64/IV

- Build on previous joint tasks 33/IV and 49/IV
- Vision: Solar heat to be recognized as a reliable (and affordable) source of energy for industry
- Focus on close-to market technologies and applications up to ~ 400°C
- Balanced SolarPACES / SHC task management and structure
- Operating Agents:
  - SHC: (HSR, Andreas Häberle)
  - SolarPACES: (DLR, Klaus Hennecke)

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Subtask structure

- Subtask A – Integrated energy systems (Uni Kassel, Bastian Schmidt)
- Subtask B – Modularization (CIEMAT, Eduardo Zarza)
- Subtask C – Simulation and design tools (UChile, José-Miguel Cardemil)
- Subtask D – Standardization and Certification (CRES, Vassiliki Drosou)
- Subtask E – Guideline to Market (Fraunhofer ISE, Peter Nitz)

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Subtask A – Integrated energy systems (Uni Kassel, Bastian Schmidt)

- Integration of solar heating plants in process heat systems (centralized / decentralized)
- Energy efficiency and heat recovery; Process integration and storage management
- The role of solar energy in hybrid energy supply systems; Combination with other heating technologies (Combined heat and power, high temperature heat pumps, Solar power/power-to-heat);
- Maximum impact (solar fraction) of solar energy based on specific boundary conditions such as location, sector, temperature demand and load profile

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Subtask B – Modularization (CIEMAT, Eduardo Zarza)

- Modular system concepts for solar process heat applications
- Collectors and hydraulics (standard packages; easy installation; easy dismantling)
- Development of “standard” (recommended) interfaces for solar process heat applications

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Subtask C – Simulation and design tools (UChile, José-Miguel Cardemil)

- System simulation
- Benchmarking of different system concepts
- Preparation of useful design tools
  (useful for planners without system simulation skills)

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Subtask D – Standardization and Certification (CRES, Vassiliki Drosou)

- Define KPIs for solar process heat systems
- Connect with relevant Technical Committees and Certification Bodies
- Work with current versions of relevant standards and legislation including EU regulations
- Provide information and contribute to the revision of relevant standards
- Develop Proposals for development of certification schemes

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Subtask E – Guideline to Market (FhG ISE, Peter Nitz)

- LCOH as benchmark for innovative systems □task 54 activities
- Financing schemes and business models for hybrid energy supply
- Alignment of solar process heat related national research and funding programs, seeking synchronization with other worldwide programs
- Acceleration of knowledge transfer to industry
- Mapping of R&D infrastructure
- Establish communication structures for stakeholders (researcher/investor, supplier, industry, relevant international organizations)
- Best practice examples of successful installations and business models (e.g. www.ship-plants.info)

Current Status:

- SolarPACES and Solar Cooling&Heating Executive Committees have approved the new Task 64/IV
- The level of co-operation (according to the SHC TCP policy on Collaborative Tasks with other IEA TCPs) shall be “Joint“.
- The official start date is January 1st, 2020
- Entities willing to participate are welcome and can join the Task team

Contact person for Spain: Eduardo Zarza Moya (eduardo.zarza@psa.es)

Subtask B: Modularization

Some facts to be considered:

- Many different integration schemes for SHIP applications have been identified
- Previous activities have been focussed on “integration”, rather than in the possibilities for “modularization
- The lack of modularized components increases the cost of projects
- Modularization of the BOP and interface between the solar system and the industrial process would simplify the design phase, thus reducing costs

Subtask B: Modularization

Subtask objective:

Definition of modularized and “normalized” components/ packages for SHIP applications (e.g., for the balance of plant, solar field, thermal energy storage and interface)

Subtask structure

- Activity B1: Modular system concepts for SHIP applications
- Activity B2: Standard components/packages for collectors and hydraulics
- Activity B3: Development of a modular and scalable interface unit

Activity B1: Modular system concepts for SHIP applications

Objective:

Definition of modular concepts for the main components and subsystems of **SHIP applications using the more common integration schemes**

Structure

- Activity B1.1: Identification of those integration schemes that are more usual in commercial SHIP applications
- Activity B1.2: Proposal of modular components/system concepts (e.g., thermal storage system, steam generator, ….)

Activity B2: Standard packages for solar collectors and hydraulics

Objective:

Definition of "normalized" components and equipment used in solar fields **and hydraulics** for SHIP applications in order to make their installation and dismantling easier and cheaper.

Structure

- Activity B2.1: Identify components suitable for "normalization" in the solar field and hydraulic circuit
- Activity B2.2: Definition of standard options for components suitable for "normalization"

Activity B3: Development of a modular and scalable interface unit *for SHIP*

Objective:

Definition of a modular and easily scalable interface unit for SHIP applications. The term “Interface” includes not only the mechanical/ hydraulic interface (pipe, valves, etc.), but also the instrumentation and signalling associated to the connection between the solar part and the industrial process

Structure

- Activity B3.1: Identification and analysis of those interfaces that are more interesting (i.e., more used in commercial projects or likely to be used in a short term)
- Activity B3.2: Basic design of a modular and scalable interface

Deliverables of Subtask B

No.	Deliverable	Month
D.B1	Integration schemes and interfaces more commonly used in commercial SHIP applications	18
D.B2	System/component modularization for SHIP applications	At the end of task

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